**SM 1020- 2011 Quality Assurance**

*"This section applies primarily to chemical and radiochemical analyses."(SM 1020 A- 2011.)(As published in SM 22nd Edition)*

Facility Name:_____VELAP ID_____

Assessor Name:_____Analyst Name:_____Inspection Date_____

| Relevant Aspect of Standards | Method Reference | Y | N | N/A | Comments |
|---|---|---|---|---|---|
| **Initial Demonstration of Capability (IDC)** | | | | | |
| (1) Do IDCs include at least a reagent blank and four LFBs at a concentration between 10 times the MDL (LOD) and the midpoint of the calibration curve (or other level specified in the method)? *(Not applicable to methods which do not require MDL.)* | 1020B.1 | | | | |
| (2) Are IDCs run after analyzing all required calibration standards? | 1020B.1 | | | | |
| (3) Does the IDC reagent blank not contain any analyte of interest at a concentration greater than half the minimum quantitation level (MQL/ LOQ) (or other level specified in the method)? *(Not applicable to methods which do not require reagent blanks, such as total suspended solids or alkalinity.)* | 1020B.1 | | | | |
| (4) Does the laboratory use one of the following as IDC acceptance limits?<br>☐ established mandatory criteria<br>☐ if there are no established mandatory criteria, laboratory- generated control limits calculated from the mean and standard deviation from at least 20 data points, within 70-130% recovery/ 20% RSD<br>☐ PT acceptance criteria from inter-laboratory PT studies, translated to percent recovery limits | 1020B.1 | | | | |
| **MDL's** | | | | | |
| (5) Are MDLs performed or verified for each analyst and instrument, as well as whenever significant modifications to the instrument or operating conditions also modify detection or chemistry?<br>NOTE: Not required when test results are not reported outside of the calibration range (2003 NELAC Chapter 5 Appendix D.1.2.1). | 1020B.4 | | | | |

Notes/Comments:

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| (6) Are MDLs determined in accordance with 1020.B.4?<br>☐ ideally, at least 7 portions of a known standard over a 3-day period<br>☐ all sample preparation steps included<br>☐ measurements should be within 1 to 5 times the estimated MDL<br>☐ recoveries should be within 50-150%<br>☐ RSD should be values ≤20%<br>☐ MDL=3.14 x standard deviation | 1020B.4 | | | | |
| (7) If calculated MDLs are not within a factor of 10 of the known standard, are the studies repeated at more suitable concentrations? | 1020B.4 | | | | |
| **Reagent Blank** | | | | | |
| (8) Does the reagent blank (method blank) consist of reagent water and all reagents, including preservatives, that normally are in contact with a sample during the entire analytical procedure? | 1020B.5 | | | | |
| (9) Is the reagent blank analyzed after the daily calibration standard and after highly contaminated samples if carryover is suspected? | 1020B.5 | | | | |
| (10) Is the reagent blank analyzed at a frequency of at least one per batch or on a 5% basis, whichever is more frequent? | 1020B.5 | | | | |
| **LCS/LFB** | | | | | |
| (11) Does the LFB (or LCS) consist of reagent water with associated preservatives, with a known concentration of the analyte(s) of interest added? | 1020B.6 | | | | |
| (12) Is the LFB a concentration of at least 10 times the MDL, less than or equal to the midpoint of the calibration curve, or at a level specified in the method? | 1020B.6 | | | | |
| **LFM** | | | | | |
| (13) If feasible and the method does not specify a frequency, Is a LFM (matrix spike) included at a frequency of one per batch or on a 5% basis, whichever is more frequent? | 1020B.7 | | | | |
| Notes/Comments: | | | | | |

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| (14) Is the LFM prepared by adding the analyte(s) of interest to the sample at a concentration at least 10 times the minimum reporting limit (MRL), less than or equal to the midpoint of the calibration curve, or a method-specified level? | 1020B.7 | | | | |
| **Matrix Dup** | | | | | |
| (15) Is a matrix duplicate or a LFM duplicate (if the analyte(s) of interest are rarely detected in a matrix type) analyzed randomly at a frequency of one per batch or on a 5% basis, whichever is more frequent? | 1020B.8 | | | | |
| (16) If LFM duplicates are analyzed, is a second portion of sample spiked before sample preparation? | 1020B.8 | | | | |
| (17) If the method does not provide limits for matrix duplicates or LFM duplicates, are preliminary limits calculated from IDC? | 1020B.8 | | | | |
| **Calibrations** | | | | | |
| (18) Are initial instrument calibrations performed using at least three standard concentrations for linear curves, at least five for nonlinear curves, or as specified by the method? | 1020B.11.b | | | | |
| (19) Is the lowest concentration of the calibration curve the reporting limit? | 1020B.11.b | | | | |
| (20) Are calibration standard concentrations chosen with no more than one order of magnitude between concentrations? | 1020B.11.b | | | | |
| (21) Are calibration acceptance criteria in the referenced method followed? | 1020B.11.b | | | | |
| (22) Are calibrations verified every 12 hours, after every 10 samples, or at the frequency specified in the referenced method, using a standard at or near the midpoint of the calibration range? | 1020B.11.c | | | | |
| **Control Charts** | | | | | |
| (23) Are accuracy (means) control charts constructed for each analytical method using either the calculated values for mean and standard deviation or percent recovery? | 1020B.13.a | | | | |
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| (24) Are accuracy control charts updated each time a QC is analyzed? | 1020B.13.a | | | | |
| (25) If required by the referenced method, are precision (range) control charts constructed using the average and standard deviation of a specified number of measurements (e.g., %RSD or RPD) for replicate or duplicate analyses? | 1020B.13.b | | | | |
| (26) When sample measurements exceed control limits, is the analysis repeated immediately? | 1020B.13.c | | | | |
| (27) If a repeated measurement still exceeds control limits, is the analysis discontinued and the problem corrected? | 1020B.13.c | | | | |
| (28) If two out of three successive points exceed a warning limit (in the same direction), is another sample analyzed, and if that sample still exceeds the warning limit, is potential bias evaluated and the problem corrected? | 1020B.13.c | | | | |
| (29) If standard deviation is tracked, and 4 out of 5 successive points exceed 1 standard deviation (in the same direction), or in decreasing or increasing order, is another sample analyzed, and if the next point is more than 1standard deviation or does not change the order, is the analysis discontinued and problem corrected? | 1020B.13.c | | | | |
| (30) If seven successive samples are on the same side of the central line (indicative of a trend), are analyses discontinued and problem corrected? | 1020B.13.c | | | | |
| (31) If measurements never or rarely exceed the warning limits, are the warning limits and control limits recalculated using 10 to 20 most recent data points? | 1020B.13.c | | | | |
| (32) As an alternative to constructing control charts, are fixed limits from a database or list used for warning limits, control limits, and trends? | 1020B.13.c | | | | |

Notes/Comments: